

an illumination beam source for illuminating the object plane with an illumination light beam of a first wavelength, and

an image lens configured to create an image of the object plane;

an autofocusing detection system comprising:

an autofocusing light beam source for generating an autofocusing light beam of a second wavelength,

a beamsplitter configured to direct the autofocusing light beam to the object plane and cause the autofocusing light beam to reflect off the object plane,

a detection system lens configured to direct the reflected autofocusing light beam to an autofocusing detection device, and

an autofocusing detection device for determining the amount of displacement of the image of the object plane in the optical system from a desired focused reference plane based on the detected displacement of an image plane of the reflected autofocusing light beam from a predetermined reference plane in the autofocusing detection system, said autofocusing detection device comprising at least one sensor for sensing the reflected autofocusing light beam and detecting the displacement of the image plane; and

a focusing correction system comprising a feedback controller and focus adjusting device for automatically adjusting the distance between the objective lens and the object plane, based on the reflected autofocusing light beam sensed by said at least one sensor, in order to properly focus the image in the optical system.

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23. (Amended) The system of claim 22, wherein the focus adjusting device is configured to adjust the position of the objective lens in order to properly focus the imaging system on the object plane.

24. (Amended) The system of claim 22, wherein the focus adjusting device is configured to adjust the position of the objective plane in order to properly focus the imaging system on the object plane.

28. (Amended) The system of claim 26, wherein the autofocus detection device further comprises a cylindrical lens positioned between the detection system lens and the plurality of light sensors, said cylindrical lens configured to change the shape of a light spot on the plurality of light sensors when the distance between the object plane and objective lens changes.

31. (Amended) The system of claim 30, wherein the focus adjusting device is configured to adjust the position of the objective lens in order to properly focus the imaging system on the object plane.

32. (Amended) A method of automatically focusing an image of an object plane in a microscope, comprising:

generating an autofocus light beam;

directing the autofocus light beam against the object plane to be examined;

reflecting the autofocus light beam off the object plane;

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